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Phytochemical Screening and Acute oral Toxicity Study of Root Extracts of *Combretum hereroense* Schinz and *Balanites aegyptiaca* Del. Traditionally Used to Treat Female Infertility in Baringo County, Kenya

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Authors' contributions

This work was carried out in collaboration among both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Aims: To carry out phytochemical screening and acute oral toxicity test to validate their safety and efficacy.
Study Design: Standard phytochemical screening tests were used to highlight phytochemical compounds of roots of the plants. The evaluation of acute toxicity of the root extracts of the plants followed the model of Acute Toxicity Class based on OECD 423 Guideline, 2001.

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Place and Duration of the Study: The study was undertaken at the Department of Chemistry & Biochemistry for the extraction for samples extraction and phytochemical screening. Acute oral toxicity studies were done at the Department of Biological Sciences for acute toxicity study, University of Eldoret, Between June and September 2022.
Methodology: Phytochemical screening for presence of Tannins, saponins, flavonoids, glycosides, alkaloids, anthocyanin, terpenoids, steroids, coumarins, lipids, proteins and carbohydrates were carried out. Acute oral toxicity studies were done using the fixed dose method at a dose of 2000mg/kg body weights of rats. Three groups were used: control and test groups for each of the respective plant root extracts. Signs of toxicity and/or mortality were monitored daily for 14 days. Weekly fasting body weights were also recorded.
Results: The phytochemical screening results showed the presence of tannins, saponins, flavonoids, glycosides, alkaloids, anthocyanin, terpenoids, steroids, lipids, proteins and carbohydrates present in the root extract of *Combretum hereroense*. Tannins, saponins, flavonoids, glycosides, terpenoids, steroids, and carbohydrates were present in root extracts of *Balanites aegyptiaca*. Following the acute oral toxicity study, there were no abnormalities observed in physiological parameters. In addition, no deaths were recorded during the study period. The LD_{50} was therefore greater than 2000 mg/kg. The fasting body weights of extract treated rats increased stably compared to the control [$p = .05$].
Conclusion: The results showed *C. hereroense* and *B. aegyptiaca* methanol root extracts were considered safe in acute oral exposure. Long-term toxicity studies are needed for further toxicological profile elicitation of the plant, and a possible reinforcement of clinical relevance of the results of laboratory studies.

Keywords: C. hereroense; B. aegyptiaca; phytochemical screening; acute toxicity test; roots.

1. INTRODUCTION

Man has relied on a huge diversity of plant species for his medicinal requirements ever since the invention of medicine. The goal of ensuring that everyone has access to healthcare is accomplished with the use of traditional medications that have been proven to be of high quality, safety, and efficacy. For many millions of individuals, traditional medicine, conventional therapy, and conventional doctors serve as their primary and, in some cases, only sources of healthcare [1]. This claim is in line with estimates from the WHO that show that for basic healthcare, around 80% of people in underdeveloped nations still use a traditional system of medicine based on herbal remedies [2]. One of the factors for the resurgence of interest in plant-based therapies, in addition to their well-established pharmacological capabilities, is that herbal medicines, being natural, are seen as safe [3]. Although herbal therapies have a good reputation, their safety has frequently not been examined, and instances of contamination, adulteration, toxicity, or poisoning are frequently found. The most popular herbs have only had a small number of high-quality toxicological studies done on them up to this point; the situation seems to be considerably worse for plants used in underdeveloped nations, particularly in African traditional medicine [4,5].

The family Combretaceae, which has *18 genera and includes Combretum, the biggest genus, with roughly 370 species, includes Combretum hereroense*, also known as the mouse-eared Combretum or Russet bush willow [6]. A little tree between 9 and 12 meters tall with a thick crown, *Combretum hereroense* is a deciduous shrub with sometimes arching stems. It yields reddish-brown, 20 millimeter-diameter, 4-winged samara fruits with thick skin [7]. In Southern and Eastern Africa, including Ethiopia, Somalia, Kenya, and Uganda, *C. hereroense* trees are most frequently found around pans, in rocky terrain, and occasionally on stream banks. Southern Africa includes Tanzania, Angola, Zambia, Malawi, Mozambique, Namibia, Botswana,

Fig. 1. *Combretum hereroense* plant and harvested roots

Fig. 2. *Balanites aegyptiaca* plant and harvested roots

and Zimbabwe. Numerous studies have shown that antioxidant chemicals found in plants have anti-inflammatory, antimutagenic, antiatherosclerotic, anticancer, anticarcinogenic, antibacterial, and antiviral properties [8]. See Fig. 1.

A prickly shrub or tree with the common name "desert date," *Balanites aegyptiaca* is found in arid regions of Africa and South Asia. Up to l0 meters tall, it is a multi-branched, prickly shrub or tree [9]. Round crown with one or more separate masses. Short trunk with frequent branching from the base [Fig. 2]. Dark brown to grey bark with deep fissures branches with up to 8 cm long, strong yellow or green thorns. Leaves have two distinct leaflets that are obovate, asymmetrical, 2.5 to 6 cm long, brilliant green, leathery, and, when young, covered with tiny hairs. Flowers are fragrant, yellowish-green fascicles that grow in the axils of the leaves. The fruit is a relatively long, slender drupe with a diameter of 1.5 to 4 centimeters and a length of 2.5 to 7 centimeters. The pyrene [stone] seed is between 1.5 and 3 centimeters long, light brown, fibrous, and very hard [10].

Cultivation and naturalization conceal natural distribution. It is said to be native to all arid regions south of the Sahara, stretching as far south as Malawi in the Rift Valley and the Arabian Peninsula. Latin America and India are where it was first domesticated. Although it has a broad biological range, it is mostly found on flat alluvial soils with deep sandy loam and unrestricted access to water. It is shade-intolerant after the seedling stage and favors open woodland or savannah for natural regeneration. It is a lowland species that may reach an elevation of 1000 m in regions with average annual temperatures of 20 to 30°C and average annual rainfall of 250 to 400 mm [11].

Jaundice, intestinal worm infection, wounds, malaria, syphilis, epilepsy, dysentery, constipation, diarrhea, hemorrhoids, stomach pains, asthma, and fever are just a few of the conditions it is historically used to treat.

C. hereroense and *B. aegyptiaca* roots are traditionally used in combination for the treatment of female infertility. According to traditional healers in Baringo, the roots are boiled and administered with positive results of implantation. When a woman is unable to become pregnant after twelve months of regular, unprotected intercourse, she is said to be infertile [12].

There are few phytochemical and toxicological studies on either plant's root extracts. In order to create a database for future studies, the goals of the current study were to determine the phytochemical profile of *C. hereroens*e and *B. aegyptiaca* roots as well as to assess the acute oral toxicity of their methanol extracts in vivo in experimental animals.

2. MATERIALS AND METHODS

2.1 Plant Collection and Identification

The medicinal plants were first identified *in situ* by a local herbalist. The healthy roots of *Combretum hereroense* and *Balanites aegyptiaca* were dug out from the ground using a Jembe, and freshly collected from around Rondinin village in Baringo County [0°44'26"N 35°52'27"E], Kenya in June 2022. The roots and plant parts were separately placed in polyethene bags and transported. University taxonomists from University of Eldoret correctly recognized and verified the plant materials. The plants were received and allocated M.U.H/COMBHE/0021/1995 and M.U.H/0192/1987 voucher numbers respectively. The Department of Biological Sciences at the University of Eldoret's herbarium housed the plant specimens. The roots were cleaned to eliminate debris, then cut into small pieces and dried in the shade for weeks before being ground into a fine powder using an electric mill (Disk Mill FFc-23, China).

2.2 Root Extraction

One hundred grams of powdered roots of *C. Hereroense* and *B. aegyptiaca* were each extracted by maceration method [13] using methanol by soaking 100 grams of respective roots in 500 ml of methanol in 1-liter conical flask for 72 hours. Filtrations were done using filter papers and the solvents were evaporated using a rotary evaporator [EL 30, model AG CH-9230, Germany] at 40°C. To thoroughly eliminate the solvents from the extracts, the resultant solutions were further dried for 24 hours at a temperature of 40°C in an oven. After that, the concentrates were placed in sealed glass jars and were kept at 4 °C until use.

2.3 Experimental Animals

Female wistar rats (*Rattus norvergicus*), weighing between 80–160 g, were obtained from the Department of Biological Sciences' animal house at the University of Eldoret. Before the trial commenced, the animals were acclimated for two weeks. Water and common commercial rodent chow were available to the animals at all times. Housing temperatures were kept at 25 ±2 °C with 12-hour day/night cycles. The animals were handled and cared for in accordance with the recognized public health standards found in the Guide for Care and Use of Laboratory Animals [14].

2.4 Preparation of Administration Doses

In this study, the Organization for Economic Cooperation and Development (OECD) standards were followed in the preparation of the doses for administration. Briefly, to make a stock solution with a dosage level of 2000 mg/kg b. wt. for administration to a rat weighing 100 g, the following formula described by Erhirhie et al. [15] was followed:

Animal dose [mg/kg b. wt] = bodyweight of the animal[g]/1000[g] × selected dose

Then 50 mg of extract should be reconstituted in 0.2 ml of the physiological saline [vehicle] in accordance with the OECD's recommendations. Physiological saline was used to serially dilute an 8 ml stock solution containing the crude methanol root extracts of *C. hereroense* and *B. aegyptiaca* to provide dosages of 2000 mg/kg b. wt. based on the individual fasting weights of the rats in this research.

2.5 Phytochemical Screening

Standard techniques were used for the extracts' phytochemical examinations [16,17].

1. Test for tannins

Each plant extract was diluted with 5 ml of distilled water to a concentration of around 0.5 g. Each extract was diluted to a volume of 1 ml with 4 drops of a neutral 5% ferric chloride solution.

The development of a dark green hue revealed the presence of tannins.

2. Test for saponins

Extracts [1 g] were diluted with distilled water to a volume of 20 ml in a test tube, and the mixture was then agitated for 15 minutes in a graduated cylinder. The presence of saponins was revealed by the formation of a 1 cm layer of foam.

3. Test for flavonoids

One milliliter [1 ml] of distilled water was mixed with 0.5 g of each plant extract. The extracts were combined with 8ml of concentrated sulfuric acid and 0.1 g of metallic zinc. The combinations were examined for red coloration, which was a sign of flavonoids' content.

4. Test for glycosides

Glycosides were tested after extracts had been hydrolyzed with dilute hydrochloric acid. To each crude extract of the whole plant, two milliliters [2 ml] of acetic acid and two milliliters [2 ml] of chloroform was added. After cooling the mixture, concentrated sulfuric acid was added in small amounts. We looked for any green color in the combination, which would indicate the presence of glycosides.

5. Test for alkaloids

On a water bath, five [5] grams of each extract were mixed with five [5] ml of 1% aqueous hydrochloric acid before being filtered. One milliliter of each extract filtrate was extracted from the filtrates and put into test tubes to see whether alkaloids were present. 2 ml of Wagner's reagent (iodine in potassium iodide) were added to 1 ml of each of the extracts. Alkaloids were detected by a precipitate that was reddish brown in color.

6. Test for anthocyanins

Two milliliters [2 mL] of distilled water diluted root extracts were each added with two milliliters [2 ml] of 2M hydrochloric acid. Appearance of a pink-red color that turns blue after addition of ammonia indicated presence of anthocyanin.

7. Test for terpenoids

Two milliliters [2 mL] of chloroform, five milliliters [5 mL] of diluted crude root extract from each plant, and three milliliters [3 mL] of strong sulphuric acid were carefully added to the test tube sidewalls to create a layer. The presence of terpenoids was revealed by the interface's reddish-brown coloring.

8. Test for steroids

One gram [1g] of each root extract was mixed with 2 ml of chloroform and 1 ml of concentrated sulphuric acid was applied along the walls of the test tube. The emergence of a red color indicated the presence of steroids.

9. Test for coumarins

One [1] g of each extract was put into a test tube, which was then coated with filter paper soaked in dilute sodium hydroxide (NaOH), and heated in a water bath for a short period of time. When the filter paper was inspected under UV light, the presence of coumarins was shown by yellow fluorescence.

10. Test for lipids

One [1] gram of each plant crude root extract was mixed with two milliliters (2 ml) of ethanol. Distilled water in an equivalent volume was added. Formation of a milky white emulsion indicate presence of lipids.

11. Test for proteins

Place each test tube with a little amount of each plant crude root extract. Two milliliters [2 ml] of 5% sodium hydroxide solution was added. Copper sulphate solution was then added in five [5] drops. The presence of proteins was indicated by a blue violet hue.

12. Test for carbohydrates

Three [3] drops of Molisch reagent was added to two milliliters [2 ml] of each water-diluted plant crude root extract. Concentrated Sulphuric acid was then gradually added along the inside walls of the glass test tube. The presence of carbohydrates was established by the development of a violet ring at the intersection of the liquid layers.

2.6 Acute Oral Toxicity Study

For this experiment, nine healthy female albino wistar rats, aged 6 to 8 weeks and weighing 90 to 155 g, were chosen at random. Guidelines 423 of the Organization for Economic Cooperation

and Development (OECD) of 2002 were followed [18]. In order to determine the baseline body weights before treatment, the rats were all weighed after overnight fasting. The rats were divided into three groups, each consisting of three female rats, at random: Group I, Group II, and Group III.

The rats in the first group, which served as a standard control, were given vehicle (water) at a dose of 1 ml/kg body weight, Group two was given *C. hereroense* root extract orally at a dose of 2000 mg/kg body weight, and Group three was given *B. aegyptiaca* root extract orally at a dose of 2000 mg/kg b. wt. Following ingestion of the root extract, food and water were provided to the animals' *ad libitum*. Individual observations of each animal were made at least once during the first 30 minutes following dosing, on occasion throughout the first 24 hours [with particular focus on the first 4 hours], and then every day for the next 14 days. Cage-side visual observations were performed once per day to check for any changes in the animals' skin, hair, eyes, mucous membranes, nasal passages, autonomic (salivation, lacrimation, and feces), and central nervous system (drowsiness and tremors) functions. The animals were fasted for the whole night before their fasting body weights were measured and recorded on days 1, 7, and 14. Rat mortalities and toxicology-related symptoms of root extracts were also monitored for up to 14th days [13].

3. STATISTICAL DATA ANALYSIS

On a Microsoft Excel spreadsheet, the information gleaned from the acute toxicity actions on body weights were collated, expressed as Mean ± Standard Error of the Mean [SEM], and analyzed using analysis of variance [ANOVA] [13]. [p =0.05] was used to determine statistical significance for values. In accordance with OECD [2002] rules [Guideline No. 423], quantitative and qualitative analyses of data on acute oral toxicity were performed.

4. RESULTS

4.1 Phytochemical Screening

Table 1 show the results of phytochemical screening of the root extracts of *B. aegyptiaca* and *C. hereroense*. The results showed that tannins, saponins, flavonoids, glycosides, alkaloids, anthocyanin, terpenoids, steroids, lipids, proteins and carbohydrates were present in the root extracts of both plants. However, alkaloids, anthocyanin, lipids and proteins were absent in the root extracts of *B. aegyptiaca*.

4.2 Acute Oral Toxicity of *C. hereroense* and *B. aegyptiaca* Plant Root Extracts

4.2.1 Effects on toxicity signs

Rat mortality data following a 2000 mg/kg b. wt. Single dosage of *C. hereroense* and *B. aegyptiaca* root extracts administration was examined, and the results revealed no animal deaths during the trial. In addition, as indicated in Table 2, no toxicity was detected in the animals' wellness indicators after the 14-day observation period.

Table 1. Phytochemical screening results of root extracts of *B. aegyptiaca* and *C. hereroense*

S. No	Phytochemical Constituents tested	Chemical test used	*C. hereroense* root extract observations	*B. aegyptiaca* root extract observations
1	Tannins	Ferric chloride test	+ve	+ve
2	Saponins	Froth test	+ve	+ve
3	Flavonoids	Pew's test	+ve	+ve
4	Glycosides	Liebermann's test	+ve	+ve
5	alkaloids	Wagner's test	+ve	-ve
6	Anthocyanin	General test	+ve	-ve
7	Terpenoids	Salkowski test	+ve	+ve
8	steroids	Salkowski test	+ve	+ve
9	Coumarins	Fluorescence test	+ve	+ve
10	Lipids	Emulsion test	+ve	-ve
11	Proteins	Biuret test	+ve	-ve
12	Carbohydrates	Molisch test	+ve	+ve

Presence [+ve], Absence [-ve]

Table 2. Signs recorded during acute toxicity studies after administration of *C. hereroense* and *B. aegyptiaca*

Wellness parameters	*C. hereroense* root extract	*B. aegyptiaca* root extract
Mucus membrane	N	N
Salivation	N	N
Lacrimation	N	N
Diarrhea	N	N
Drowsiness	N	N
Tremors	N	N
Death	N	N

Absence [N], Presence [+]

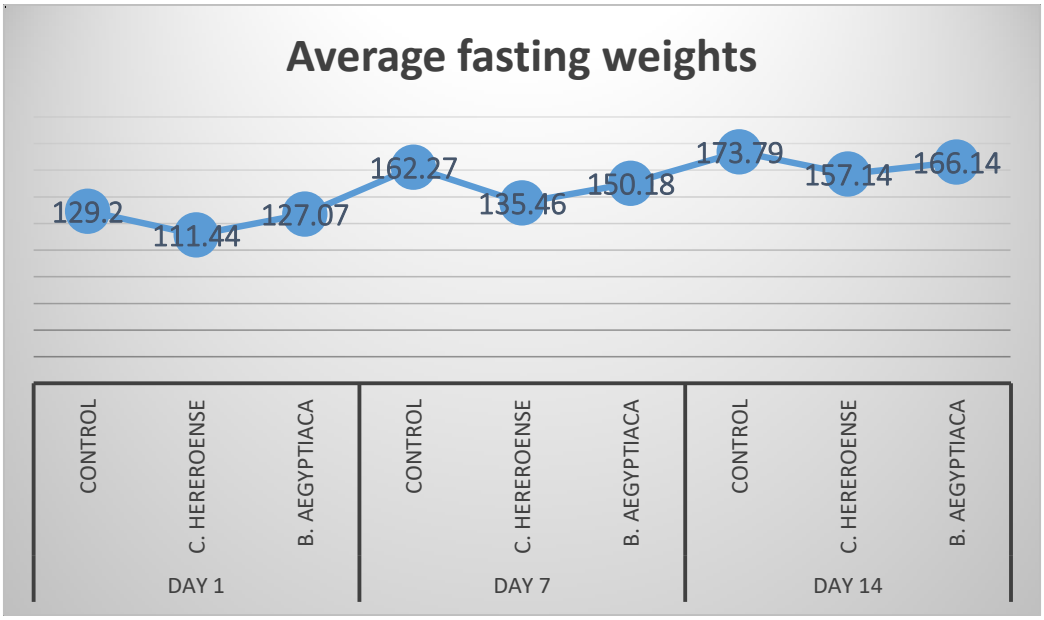

Fig. 3. Trend in average weight gains for control, *C. hereroense* and *B. aegyptiaca* root extracts from day zero [day 1] - day 14

Table 3. Fasting weights comparison of *C. hereroense* and *B. aegyptiaca* root extracts from day zero [day 1] – day 14

Days	Experiments	Count	Average±sd
Day 1	Control	3	129.20 ± 21.19^{a}
	C. hereroense	3	111.44 ± 18.17^{a}
	B. aegyptiaca	3	127.07 ± 31.53^{a}
Day 7	Control	3	162.29 ± 7.87^{b}
	C. hereroense	3	135.46 ± 11.07^{ab}
	B. aegyptiaca	3	150.18 ± 18.59^{ab}
Day 14	Control	3	173.79 ± 14.16^{c}
	C. hereroense	3	157.14 ± 14.72^{bc}
	B. aegyptiaca	3	166.14 ± 20.14^{a}

Means with different letters along the columns are significantly different at P<0.05

4.2.2 Effects of root extracts on fasting body weights

From the first day of therapy to the fourteenth day, all of the female rats' body weights grew in relation to their original weight values. The alterations in the animals' fasting body weight throughout the course of the 14-day treatment regimen rose progressively [Fig. 3]. Throughout the 14-day period, the body weights of all the

extract-treated mice steadily increased while fasting. The control group rats had the following individual fasting body weights, [129.2g, 162.2g and 173.79g] respectively; *C. hereroense* group [111.44g, 135.46g and 157.14g], while *B. aegyptiaca* group [127.07g, 150.18g and 166.14g] for day 1, 7, and 14 respectively. Therefore, the extracts may be considered safe at dose of 2000 mg/kg b. wt. in rats.

4.2.2.1 Comparison of weights obtained from different extracts treatments from day zero [day 1] -day 14

For day zero, *B. aegyptiaca* root extract had the highest average fasting weight of 127.07±31.53 sd with a coefficient variation of 24.81% while *C. hereroense* root extract had the lowest average [111.43±18.17sd] with a coefficient variation of 16.30% with no significant difference [$F_{0.05\ [2,\ 6]}$ =0.48, p=0.6419]. For day 7, control [162.29±7.86 sd] had the highest insignificant average [$F_{0.05\ [2,\ 6]}$ =3.06, p=0.1211] while *B. aegyptiaca* root extract had the lowest [150.18±18.59sd]. In day 14, control still held the highest average of 173.79±14.15sd with no significant difference [$F_{0.05\ [2,\ 6]}$ =0.76, p=0.5080] as illustrated in Table 3. When the comparisons were made from day 1 to 14 for control, day 14 recorded the highest average173.79±14.15 while day zero recorded the lowest with a significant difference [$F_{0.05\ [2,\ 6]}$ =6.78, p=0.0289], similar result were recorded for *C. hereroense* root extract [$F_{0.05\ [2,\ 6]}$ =7.03, p=0.0268]. *B. aegyptiaca root* extract averages from day 1 to 14 did not change significantly [$F_{0.05\ [2,\ 6]}$ =6.78, p=0.2173].

4.2.2.2 Trend in average weights gain for the control, C. hereroense and B. aegyptiaca groups of root extracts from day 1 to day 14

Rats that received distilled water in the control showed insignificant weight gain from 129.20±21.19 sd to 173.79±14.16 sd. Control average weight gain trend from day 1 to day 14 indicated highest weight gain occurred from day 1 to day 7 [33.08g increase] [25.61%] and low from day 7 to day 14 [6.62%]. The trend in weight gain increased insignificantly with days [β=22.2933, R^2=0.927, $F_{0.05\ [1,\ 1]}$ =12.81, p=0.1735] with a model equation of:

*Control group = 110.507 + 22.2933*day.*

Rats treated with *C. hereroense* root extract showed a significant weight gain from 111.44±18.17sd to 157.14±14.72sd for group II. *C. hereroense* root extract average weight gain trend from day 1 to day 14 indicated highest weight gain occurred from day 1 to day 7 [24.02g increase] and low from day 7 to day 14. The trend in weight gain increased significantly with days [β=22.8517, R^2=0.99.82, $F_{0.05\ [1,\ 1]}$ =1134.70, p=0.0189] with a model equation of:

*C. hereroense root extract treated group = 88.9767 + 22.8517*day.*

Rats treated with *B. aegyptiaca* root extracts showed insignificant weight gain from 127.07±31.53sd to 166.14±20.13sd for *B. aegyptiaca* root extract. The trend in weight gain increased insignificantly with days [β= 19.5300, R^2=0.9889, $F_{0.05\ [1,\ 1]}$ =89.7400, p=0.0.0670] with a model equation of:

*B. aegyptiaca root extract treated group= 88.9767 + 22.8517*day as portrayed in* Fig. 2*.*

5. DISCUSSION

Plants are utilized to prevent a number of ailments, according to several research. Given the present globalization of medicine and the high levels of safety, efficacy, and affordability of medications derived from plant sources, the relevance of plants in medicine has only grown. Insecticidal, antibacterial, antifungal, anticonstipative, spasmolytic, antiplasmodial, and antioxidant activity are among the beneficial therapeutic properties of the majority of phytochemicals. Thus, each phytochemical component found in the plants gives them their therapeutic value. The study of poison is called toxicity. Toxic effects are those that happen soon [often within 24 hours] following oral administration of a single dosage or several doses of a chemical, according to the Organization for Economic and Development [OECD]. Plant and botanical interactions can result in poisoning, which can cause harm or even death. Whether a plant's biological activity is toxicity or a pharmaceutical trait, its chemical components determine it. As a natural defense against unfavorable environments, several plants develop harmful secondary metabolites. Some plant species that are significant to toxicology and medicine do not differentiate between these hazardous compounds and therapeutically

effective components [**Error! Reference source not found.**19].

Therefore, in order to prove the safety and effectiveness of *C. hereroense* and *B. aegyptiaca* roots, it was required to determine their phytochemical and toxicological profiles. The roots of the two medicinal plants examined in the current study were found to be rich in phytochemicals after phytochemical screening and qualitative evaluation. The presence of tannins, saponins, flavonoids, glycosides, alkaloids, anthocyanin, terpenoids, steroids, lipids, proteins, and carbohydrates was discovered in root extracts of *C. hereroense*. The presence of tannins, saponins, flavonoids, glycosides, terpenoids, steroids, and carbohydrates was discovered in *B. aegyptiac*a root extract [Table 1]. These findings align with other findings from earlier investigations into the analgesic properties of various medicinal plants [20].

Anthocyanin enhance the effectiveness of the human immune system's defense against viral infections. The process is a little more complicated; certain anthocyanin may directly reduce the capacity of influenza viruses to infect humans by preventing the virus from entering human cells, preventing it from spreading from infected cells, or by acting as a virucide [21]. The ability of coumarins and flavonoids to scavenge free radicals and chelate metal ions accounts for their antioxidant capabilities, which have been shown in several investigations to make them promising antioxidants [22]. Fatty acids have several biological effects, including anticancer, antibacterial, and anti-inflammatory actions, as shown by numerous pharmacological research [223]. Tannins and terpenoids are thought to have analgesic and anti-inflammatory properties. In addition, tannins contribute the astringency characteristic, which has the effect of hastening the healing of wounds and irritated mucous membranes [24]. In addition to their commercial uses as foaming and surface-active agents, saponins have historically been widely employed as detergents, as insecticides, and as molluscicides. They also have favorable health benefits [25]. Steroidal compounds are of importance and of interest in pharmacy due to their relationship with sex hormones [226]. The presence of bioactive substances suggests that C*. combretum* and *B. aegyptiaca* have therapeutic relevance. Initial qualitative testing is helpful in identifying bioactive principles, which may then result in the discovery and development of drugs.

This study examines the safety of this plant component by identifying potential negative effects in light of the significant traditional use of the root. For the toxicological experiment, female rats received an oral dosage of an aqueous extract at a dose of 2000 mg/kg body weight. Examined clinical symptoms and fasting body weights were noted [Fig. 3 and Table 3], and there were no impacts on mortality. The OECD's Guideline 423 estimates the median fatal dosage as 2000 mg/kg body weight [18] in the absence of death. According to the Globally Harmonized System of Classification and Labeling of Chemicals of the United Nations, methanol extract of *C. hereroense* and *B. aegyptiaca* may be categorized as a material unlikely to produce acute risks with such a median fatal dosage [27]. These findings are consistent with earlier research that found no mortality from a single intraperitoneal injection of 2000 mg/kg body weight [28]. This concurs with the previous studies conducted by Saikarthik et al. [29] and Lalitha et al. [30]. These authors demonstrated that after two weeks of observation, single oral dosages of methanol root extract of *Eichhornia Crassipes* [2000 mg/kg b. wt.] provided to the rats did not cause a significant change in weight in these animals.

6. CONCLUSIONS

The phytochemical composition and toxicological effects of root wood from *C. hereroense* and *B. aegyptiaca* were examined in the current study. The roots of *C. hereroense* and *B. aegyptiaca* included a variety of phytochemical groups, according to phytochemical screening. The acute oral toxicity data demonstrated that, up to a dosage of 2000 mg/kg b. wt., the root extracts did not cause death in the rats. In both treatment groups of rats, weight gains were steady. According to the current findings, the root extracts of *C. hereroense* and *B. aegyptiaca* are safe during oral acute toxicity exposure, subject to the outcomes of hematological and pathological investigation. Toxicology studies must be expanded to include long-term toxicity assessments, such as sub chronic [90 days of repeated treatment] and chronic [at least 6 months of recurrent administration in rodents]. Exploiting these pharmacological qualities requires more research on the active components using different extraction,

purification, separation, crystallization, and identification methods.

ETHICAL APPROVAL AND CONSENT

It is not applicable.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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